Mobile whip for 40 metres

Ron Holmes VK5VH

I have built whip antennas using several different designs, for both 40 and 20 metres. This article provides the construction details of one model that has proved very successful, to assist anyone keen to make their own.

The antenna comprises a helical–wound lower section with a telescopic whip mounted on top to provide length adjustment. The helical section is wound on a plastic pipe and this is enclosed in an outer pipe to provide weather protection, as well as mechanical strength.

The construction materials are readily available from hardware stores.

Helical section

I used PVC pipe with an outside diameter of 22 mm. Its total length is 50 cm and the helical winding occupies the central 45 cm.

The winding was made using bare copper wire, about 0.5 mm diameter. I have also used plain tie-wire for this but the important point is that the wire diameter must be small enough to allow the assembly to fit inside the outer tube. The winding pitch is not critical at about 5 turns per cm. The wire was anchored at each end using a small hole drilled through the pipe. Add a coat or two of clear varnish to hold the windings in place.

A piece of wooden dowel, about 5 cm long, was glued inside one end of the pipe. A hole was bored along the axis of the dowel, of the correct diameter to fit and support the telescopic whip. A similar method was used at the other end to fix in place an axial mounting screw. This should have the correct diameter and thread to suit your antenna base.

Using two flexible insulated jumpers, I connected the helical winding to the telescopic whip at the top end and to the mounting screw at the bottom. These soldered connections should be made with care, watching out for dry joints.

Final assembly

My outer tube was made from similar PVC piping with an outside diameter of 27 mm. The length was 50 cm, the same as the inner pipe. Also required are two end caps to fit the larger pipe.

A hole was drilled through the centre of each end cap, one to suit the diameter of the telescopic whip, and one to suit the mounting screw.

The final assembly was completed by sliding the smaller pipe inside the larger one, and adding the two end caps. The latter were fixed in place with a couple of short self-tappers. The antenna is shown in Figure 1, using a cut-away presentation to expose the inner pipe and helix.

Options

I have added a modification to this design which allows it to be used on 20 and 30 metres, as well as 40 metres, thus covering the most commonly used mobile bands. All this requires is a tapping on the helix about 18 cm up from the bottom and an external flexible lead connected to the tap. With a sturdy clip, connect the other end of this lead to the base of the telescopic whip for operation on 20 metres, or to the mounting screw for 30 metres operation.

A similar mobile whip can be made specifically for 20 metres by following the same design, but making the pipe length 35 cm instead of 50 cm.

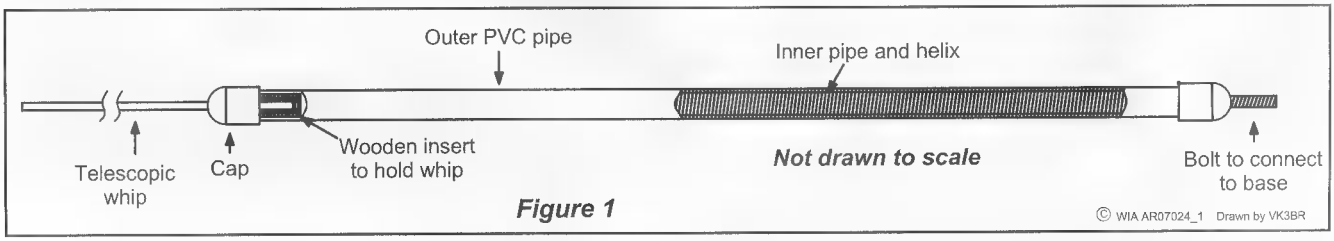

Figure 1: Whip assembly (cut-away to show helix).

A precision sheet metal bender for around $40 *continued*

Parts List

Steel cut to size

2@ 150 mm lengths of 75 x 6 mm mild steel flat bar
2@ 105 mm lengths of 75 x 6 mm mild steel flat bar
1@ 600 mm length of 75 x 75 x 5 mm angle iron (or 75 x 75 x 6 mm if available)
2@ 530 mm lengths of 25 x 3 mm mild steel flat bar
2@ 90 mm lengths of 20 x 20 mm mild steel bar
2@ 300 mm lengths of 9 mm diameter mild steel rod

Hardware

32@ 10 gauge 60 mm long countersunk steel wood screws
16@ 4 gauge 25 mm long countersunk steel screws
6@ 3/8" BSW steel nuts
6@ 3/8" bore steel washers
2@ ½" (shank) diameter steel coach screws (hinge pins)
2@ 3 mm diameter 25 mm long split pins
4@ 30 mm long ¼" BSW steel bolts
4@ ¼" BSW steel nuts
2@ 40 mm long 5/16" BSW steel bolts
2@ 5/16" BSW steel nuts
2 @ 180 mm lengths of 3/8" BSW threaded steel rod

Timber

Sufficient 18 mm thick chipboard offcuts to make 5 strips 115 mm wide x 600 mm long and 5 strips 100 mm x 600 mm long (see text for alternatives).